

OPERATOR CONTROL DEVICE

FIELD OF THE INVENTION

[0001] The present invention relates to an operator control device in motor vehicles for selecting and operating functions by manual inputs.

BACKGROUND INFORMATION

[0002] In order to avoid confusion, it appears desirable for the increasing variety of systems in motor vehicles, for at least some of the systems and functions such as, for example, car telephones, destination routing system, car radio or air conditioning system, to be operated by a common device. The control of a plurality of systems or functions using a common operator control device is usually carried out by menu-controlled operator surfaces such as are customary and widespread on PCs, palmtops, Internet pages, information systems, automatic travel ticket machines, etc. At each level of the hierarchically organized menus, the operator control alternatives or input alternatives which are respectively available are usually displayed to the user on a display. The user makes a selection from these alternatives by using suitable devices to mark the input alternative which is desired by him and by confirming the selection of this alternative, also using suitable devices, to the controlling system.

[0003] German Published Patent Application No. 198 07 410 describes a multi-function operator control device for a motor vehicle for selecting and controlling functions. The individual operator control elements are arranged around a screen. In this context, function pushbutton keys are partially provided with a permanently assigned functionality for safety-related functions and with operator control elements which are realized by switches or knobs. Furthermore, there are further pushbutton keys with a freely programmable functionality. That is to say, the pushbutton keys can support different functions in different operator control situations, essentially as a function of the system to be operated at a particular time, with respective assignment of the pushbutton keys being made by a system for controlling the operator control sequences. In addition, it is possible to use areas of the touch-sensitive screen for directly selecting an input alternative (referred to as Soft-Keys) which has been selected by the user.

[0004] For the driver of a vehicle, it is important in every operator control process that his eyes are not distracted from the road over a relatively long period of time. For this reason, it is favorable if operator control facilities are arranged as far as possible in the direct field of vision and the actual operator control device is arranged as far as possible in the directly accessible operator control area. Such an ergonomically advantageous arrangement of display and operator control device, which also provides a menu-controlled operator prompt, is described, for example, in German Published Patent Application No. 100 46 908. The individual operator control elements are implemented by pushbutton keys and rotary knobs.

[0005] The distraction of the driver from observing the road traffic can be reduced further by not only displaying information on the display but also additionally providing information by the operator control device itself.

[0006] German Published Patent Application No. 44 43 912 describes, for the operator control of functions in a motor vehicle, a flat operator control panel which is divided into pushbutton keys, each of which is assigned a switching contact. The selection facilities or functions which are assigned to the pushbutton keys are freely programmable. The respectively current selection possibilities or functions are displayed separately from the operator control panel on a display in the field of vision of the driver, corresponding to the arrangement of the pushbutton keys. The keypad is provided with a touch-sensitive layer, permitting the position of a finger on the operator control panel to be detected. As a result, the area which corresponds to the touched pushbutton key on the operator control panel is highlighted visually on the display. Furthermore, the pushbutton keys of the operator control panel are delimited from one another in a perceptible fashion by salient boundary lines in order to facilitate blind orientation.

[0007] German Published Patent Application No. 197 31 285 describes various operator control elements which signal to the user the available operator control or input alternatives by a surface which can be sensed in a tactile fashion. A surface of the operator control element which can be sensed in a tactile fashion makes it possible to indicate clearly to the user which operator control alternative is currently valid or with which operation he can make a selection from various menu items. The operator control surface is divided into an unmoving part and into raiseable or extendable segments which are led into it. In the case of a flat arrangement of the operator control element, raised segments signal the presence of selection alternatives, and in the case of a rotary arrangement of the operator control element, folded-out segments signal the operator control alternative of "rotation" and the countersunk segments signal the operator control alternative of "pressing".

[0008] However, the field of use of the described operator control elements for the motor vehicle is restricted to selection and control functions. Complex operator control processes, such as, for example, searching through a telephone list for a specific entry or inputting a destination address for a destination routing system can, however, be carried out most easily by handwritten character inputs. It is often already sufficient to input a small number of characters in order to produce a large number of alternatives to a selection which can be represented. This method of limiting a large number of alternatives is useful in particular in cases in which the writing keyboard is not available, or else situations in which using such a keyboard constitutes an excessively complex task even if the keyboard were to be simulated on a touch screen. This also relates to the operator control situation in the vehicle.

[0009] However, using a touchpad or else a touchscreen, such as are used for handwritten inputs, for selection operations which are to be carried out blind while driving is disadvantage because the smooth surface can be sensed in a tactile fashion only to a poor degree. Even if such a touchpad, such as is described, for example, in PCT International Published Patent Application No. WO 01/54109, can provide information about functionalities or operator control states such that the information can be felt by the user through pulses or vibrations in the surface which are different in certain areas, this still does not permit any reliable blind operator control while driving: haptic infor-